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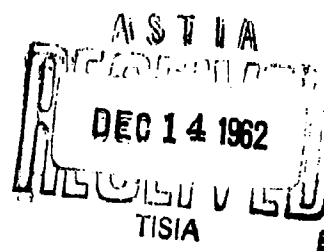
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DETERMINATION OF THE DEGREE OF ACTIVITY OF AN ANTIANTHRAX SERUM USED ON WHITE MICE

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DETERMINATION OF THE DEGREE OF ACTIVITY OF AN
ANTIANTHRAX SERUM USED ON WHITE MICE

- USSR -

[Following is the translation of an article by
Professor K. V. Likhachev, State Scientific-
Control Institute of Veterinary Preparations,
in the Russian-language periodical Trudy [?]
(Proceedings ...), Vol 6, 1956, pages 262-264.]

Summary

~~The author describes~~ a series of experiments, aimed
at discovering a more precise method for determining the
strength or activity of antianthrax serum than the present-
ly widespread method of testing with inoculation of
rabbits. ~~The author calibrated~~ the strength of antianthrax
serum of strain STI on the basis of the number of white mice
dying upon inoculation with various concentrations of the
serum. *was calibrated*

* is described.

At the present time the active specific properties
of antianthrax immunity serum are determined on rabbits.
This method is very widespread, although it is accompanied
by great imprecision because it does not enable establish-
ment of the degree of activity of the biopreparation. In
attempting to perfect the method of titration of anthrax
serum, many scientists have tried to find another animal
which would enable resolution of this task. White rats,
white mice and other animals were tested. This path of
investigation, however, was not substantiated.

In seeking a more perfected method of titration of

[antianthrax serum the present author selected white mice as] experimental animals most suitable for laboratory manipulation. Because of its particular biological properties, encapsulated anthrax vaccine of strain STI was used as anthrax culture. In white mice the STI anthrax strain evokes a gradually growing infection, first forming edema at the site of introduction of the culture. In our opinion these properties of the strain, in combination with the immunoserum, must enable smooth development of the infection process, and also must reveal the specificity and degree of activity of the biopreparation.

The initial, orienting experiments enabled certain conclusions to be made with respect to the specificity of control of antianthrax serum in white mice with anthrax vaccine of the STI strain, which does not encapsulate, because only the antianthrax serum prevented the death of white mice from lethal doses of the culture.

At the same time it was established that white mice 14 to 18 g in weight are the most suitable for the given purpose.

An outline of the dilution of various series of antianthrax serum used in titration is presented in Table 1. Our experiment included both highly active series, and serum series with reduced activity.

Table 1.

Outline of Dilution of Antianthrax Serum

Dilution on the Order of:	Amount of Serum, ml	Amount of Physiological Solution, ml
1	0.1	0.4
2	0.05	0.45
3	0.001	0.499

For the purpose of simplification and ease of dilution of the serum, the amount of physiological solution and amount of serum used were approximately 10-fold greater. The diluted sera were injected subcutaneously in the back of the white mice, in dosages of 0.5 ml. The control white mice were inoculated with washes of one-day agar culture of the STI strain, diluted to 5 or 6 billion microbe-body

content. A dosage of 0.5 ml of this suspension was injected subcutaneously at the internal surface of the thigh 20 to 24 hours after injection of the serum. The inoculated white mice were observed for a period of 8 to 10 days, i.e. 3 or 4 days after the death of the control mice. After the period of observation the local reaction to injection of the culture was studied and evaluated in the inoculated white mice. They were classified as follows, depending upon the strength of the reaction:

- (a) no reaction, 0;
- (b) very weak, hardly noticeable edema of thigh, +;
- (c) edema of thigh, not extending to the abdominal wall, ++;
- (d) pronounced edema of thigh and part of the adjacent abdominal surface, +++.

A sample outline of the titration of the serum is shown in Table 2.

Table 2.

Group	No. of Serum Series	Total Dosage of Serum (ml)	Serum Dilution		Amount of Physiological Solution, ml	No. of Inoculated White Mice	Evaluation of Reaction		Results of Experiment	
			Amount of Serum, ml	Amount of Serum, ml			Strength of Edema	White Mice Dying	Surviving	
Experimental	105	0.5	0.1	0.4	3	0,0,0	--	3	3	Serum Active
		0.5	0.05	0.45	3	0,0,+ +	--	3	3	" "
		0.5	0.001	0.499	3	+++	3	--	--	" "
Control	--	--	--	--	4	+++	4	--	--	--

In the control mice inoculated with 0.5 ml suspension of microbes of the above strain, containing 5 to 6 billion microbe bodies, edema often was lacking due to the rapid death of the animals.

On the basis of a great deal of material on the titration of antianthrax serum the following rules for evaluation of the activity of the biopreparation were established.

ished.

1. The serum was considered active if all white mice inoculated with doses of 0.1 and 0.05 ml survived, but the control mice died within 3 to 6 days after inoculation.

2. The serum was considered to have reduced activity if two or three of the white mice inoculated with 0.05 ml dosage died, but those inoculated with 0.1 ml survived.

3. The serum was considered to have very low activity and to be unsuitable for practical application if any of the white mice died upon inoculation with 0.1 ml dosage.

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